

FOREIGN CLAIMS AND ABSTRACT:

1. A multiple description video encoding method comprising the steps of:
identifying based on content of a frame at least one region of interest (ROI) in said frame, said frame being one of a plurality of frames comprising a video sequence being encoded in parallel by two motion compensation processes to produce two respective streams to be transmitted to a decoder, each stream including a mismatch signal usable by the decoder to reconstruct a part of the video sequence motion compensated to produce the other stream;

determining, for said frame, a portion of said mismatch signal that resides outside said at least one ROI; and

precluding from the transmission said portion.

2. The method of claim 1, wherein the video sequence includes an odd stream and an even stream that are motion compensated in parallel for subsequent transmission on separate channels, the odd stream comprising a downsampled subset of the plural frames, the even stream comprising those of the plural frames that are not in the subset, each stream further comprising upon said transmission a residual image from a central motion compensation executing in parallel with the odd and even stream compensations and upon each stream, motion vectors and, except where precluded, said mismatch signal, said mismatch signal being representative of a difference between a side prediction image and a central prediction image, said side prediction image being derived based on the motion compensation of the respective one of the odd and even streams, said central prediction image being derived based on said central motion compensation.

3. The method of claim 2, wherein said central prediction image is subtracted from an original image to produce said residual image.

4. The method of claim 2, wherein said motion vectors comprise a motion vector between temporally consecutive frames of said video stream and wherein said motion vectors comprise a motion vector between frames temporally separated by one intervening frame in said video stream.

5. The method of claim 1, wherein said identifying step further comprises a step selected from the group consisting of detecting a face of a person, detecting uncorrelated motion, detecting a predetermined level of texture, detecting an edge and detecting object motion of a magnitude greater than a predefined threshold.

6. A multiple description video encoding method comprising the steps of:
forming a side prediction image by motion compensating a single frame of a video sequence; and

forming a central prediction image from a weighted average of frames motion compensated in a central motion compensation in parallel with the motion compensation that forms the side prediction image, the average being weighted by respective adaptive temporal filter tap weights that are updated based on content of at least one frame of said sequence.

7. The method of claim 6, wherein said content of at least one frame includes the presence of a moving object, or the occurrence of scene change, in an image derived from said at least one frame.

8. The method of claim 6, wherein the video sequence includes an odd stream and an even stream that are motion compensated in parallel for subsequent transmission on separate channels, the odd stream comprising a downsampled subset of the plural frames, the even stream comprising those of the plural frames that are not in the subset, each stream further comprising upon said transmission motion vectors, a residual image from a central motion compensation executing in parallel with the odd and even stream compensations and upon each stream, and a mismatch signal that is representative of a difference between the side prediction image and the central prediction image, said side prediction image being derived based on the motion compensation of the respective one of the odd and even streams, said central prediction image being derived based on said central motion compensation.

9. The method of claim 8, further including the step of determining a frequency at which the taps weights are to be updated based on a decrease in the residual image due to the updating and consequent decrease in bits to be transmitted in said transmission and based on an increase in bit rate in transmitting new adaptive temporal filter tap weights in response to the updating.

10. A multiple description video encoder comprising:

an odd side encoder and an even side encoder for performing on frames of a video sequence motion compensation in parallel to produce two respective streams to be transmitted to a decoder, each stream including a mismatch signal usable by the decoder to reconstruct a part of said video sequence motion compensated to produce the other stream;

a region of interest (ROI) selection unit for identifying based on content of a frame at least one ROI in said frame ; and

a mismatch error suppression unit for determining, for said frame, a portion of said mismatch signal that resides outside said at least one ROI and precluding from the transmission said portion.

11. The video encoder of claim 10, wherein said motion compensation in parallel operates on an odd video stream and an even video stream for subsequent transmission on separate channels, the odd stream comprising a downsampled subset of frames of said video sequence, the even stream comprising those frames of the sequence that are not in the subset, each stream further comprising upon said transmission a residual image from a central motion compensation executing in parallel with the odd and even stream compensations and upon each stream, motion vectors and, except where precluded, said mismatch signal, said mismatch signal being representative of a difference between a side prediction image and a central prediction image, said side prediction image being derived based on the motion compensation of the respective one of the odd and even streams, said central prediction image being derived based on said central motion compensation.

12. The video encoder of claim 11, wherein said subset is comprised of alternate frames of said sequence so that each of the odd and even video streams includes every other frame of said sequence.

13. The video encoder of claim 11, wherein said central encoder is configured for subtracting said central prediction image from an original image to produce said residual image.

14. The video encoder of claim 11, wherein said motion vectors comprise a motion vector between temporally consecutive frames of said video stream and wherein said motion vectors comprise a motion vector between frames temporally separated by one intervening frame in said video stream.

15. The video encoder of claim 10, wherein said ROI selection unit is configured for detecting at least one of a face of a person, uncorrelated motion, a predetermined level of texture, an edge, and object motion of a magnitude greater than a predefined threshold.

16. A multiple description video encoder comprising:
an odd side encoder and an even side encoder for performing on frames of a video sequence motion compensation in parallel to produce two respective streams to be transmitted to a decoder, each stream including a mismatch signal usable by the decoder to reconstruct a part of said video sequence motion compensated to produce the other stream;
means for forming a side prediction image by motion compensating a single frame of said sequence; and
means for forming a central prediction image from a weighted average of frames motion compensated in a central motion compensation, the average being weighted by respective adaptive temporal filter tap weights that are updated based on content of at least one frame of said sequence.

17. The video encoder of claim 16, wherein said content of at least one frame includes the presence of a moving object, or the occurrence of scene change, in an image derived from said at least one frame.

18. The video encoder of claim 16, wherein said motion compensation in parallel operates on an odd video stream and an even video stream for subsequent transmission on separate channels, the odd stream comprising a downsampled subset of frames of said video sequence, the even stream comprising those frames of the sequence that are not in the subset, each stream further comprising upon said transmission a residual image from a central motion compensation executing in parallel with the odd and even stream compensations and upon each stream, motion vectors and, except where precluded, a mismatch signal that is representative of a difference between a side prediction image and a central prediction image, said side prediction image being derived based on the motion compensation of the respective one of the odd and even streams, said central prediction image being derived based on said central motion compensation, said video encoder further including a bit rate regulation unit configured for determining a frequency at which the taps weights are to be updated based on a decrease in the residual image due to the updating and consequent decrease in bits to be transmitted in said transmission and based on an increase in bit rate in transmitting new adaptive temporal filter tap weights in response to the updating.

19. A computer software product that includes a medium readable by a processor and having stored thereon:

a first sequence of instructions which, when executed by said processor, causes said processor to identify based on content of a frame at least one region of interest (ROI) in said frame, said frame being one of a plurality of frames comprising a video sequence being encoded in parallel by two motion compensation processes to produce two respective streams to be transmitted to a decoder, each stream including a mismatch signal usable by the decoder to reconstruct a part of the video sequence motion compensated to produce the other stream; and

a second sequence of instructions which, when executed by said processor, causes said processor to determine, for said frame, a portion of said mismatch signal that resides outside said at least one ROI and to preclude from the transmission said portion.

20. The product of claim 19, wherein said first sequence of instructions comprises instructions, which when executed by the processor, cause the processor to detect at least one of a face of a person, uncorrelated motion, a predetermined level of texture, an edge, and object motion of a magnitude greater than a predefined threshold.

21. A multiple description video decoder for motion compensation decoding two video streams in parallel, the decoder using a mismatch signal, received from a motion compensation encoder that produced one of the streams, to reconstruct a sequence of video frames motion compensated to produce the other stream, said decoder comprising means for receiving tap weights updated by the encoder based on content of the video streams and used by the decoder to make an image prediction based on both of said streams.